



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/757,265

01/14/2004

B. Ryland Wiggs

N1076

4898

23456 7590 11/27/2007  
WADDEY & PATTERSON, P.C.  
1600 DIVISION STREET, SUITE 500  
NASHVILLE, TN 37203

EXAMINER

ALI, MOHAMMAD M

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

11/27/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/757,265

Applicant(s)

WIGGS, B. RYLAND

Examiner

Mohammad M. Ali

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 63-90 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 85-88 is/are allowed.
- 6) ☒ Claim(s) 63,64,66,68-70,72,74,75,77,79-81,83,89 and 90 is/are rejected.
- 7) ☒ Claim(s) 65,67,71,73,76,78,82 and 84 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 63, 74, 89 and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiggs et al., (5,671,608) in view of Aoyagi et al., (6,390,183). Wiggs et al., disclose a direct expansion geothermal heat pump except R410A refrigerant. See Abstract. Aoyagi et al., teach the use of R410 refrigerant in a heat exchanger for the purpose of enhancing heat transfer coefficient and to protect ozone layer. See column 6, lines 46-61, column 7, lines 29-45 and column 16, lines 15-39. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the direct expansion geothermal heat pump of Wiggs et al., in view of Aoyagi et al., such that R410 refrigerant could be provided in order to run a direct expansion heat pump system. Claims 68 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable between 50 psi and 180 psi could be provided in order to run a

direct expansion heat pump system.

Claims 64 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiggs et al., (5,671,608) in view of Aoyagi et al., (6,390,183) as applied to claim 63 above and further in view of Suzuki et al., (6,840,058). Wiggs et al., in view of Aoyagi et al., disclose the invention substantially as claimed as stated above. However, Wiggs et al., in view of Aoyagi et al., do not disclose polyolester oils. Suzuki et al., teach the use of polyolester oil as lubricating oil in carbon dioxide refrigerant system for the purpose of running of the refrigerant control system with a compatible lubricant oil with the carbon dioxide refrigerant. See column 11, lines 14-28. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the direct expansion geothermal heat pump of Wiggs et al., in view of Aoyagi et al., and further in view of Suzuki et al., such that polyolester oil could be provided in order to run a direct expansion heat pump system with carbon dioxide refrigerant.

Claims 69 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiggs et al., (5,671,608) in view of Brasz et al., (6,892,522) as applied to claims 68 and 79 above and further in view of Aoyagi et al. Wiggs et al., in view of Brasz et al., disclose the invention substantially as claimed as stated above. However, Wiggs et al., in view of Brasz et al., do not disclose R410 refrigerant. Aoyagi et al., teach the use of R410 refrigerant in a refrigerant heat exchanging cycle for the purpose of enhancing heat transfer coefficient and to protect ozone layer by using high pressure HFC

refrigerant. See column 6, lines 8-36. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the direct expansion geothermal heat pump of Wiggs et al., in view of Brasz et al., and further in view of Aoyagi et al., such that R410 refrigerant could be provided in order to run a direct expansion heat pump system.

Claims 70 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiggs et al., (5,671,608) in view of Brasz et al., as applied to claim 68 and 79 above and further in view of Suzuki et al. Wiggs et al., in view of Brasz et al., disclose the invention substantially as claimed as stated above. However, Wiggs et al., in view of Brasz et al., do not disclose polyolester oils. Suzuki et al., teach the use of polyolester oil as lubricating oil in a climate control system for the purpose of running of the climate control system. See column 11, lines 14-28. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the direct expansion geothermal heat pump of Wiggs et al., in view of Brasz et al., and further in view of Suzuki et al., such that polyolester oil could be provided in order to run a direct expansion heat pump system with carbon dioxide refrigerant.

#### Allowable Subject Matter

Claims 86-88 are allowed.

Claims 65, 67, 71, 73, 76, 78, 82 and 84 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

Applicant's arguments filed 10/04/07 have been fully considered but they are not persuasive. The Applicant argued that R-410 Refrigerant in a Geothermal DX System is Not Taught or suggested in the cited Art. The examiner disagrees. The Examiner concedes that the main barrier to the applicant to accept the definition of a DX (direct expansion) system and regular refrigerant system as a concrete single definition as mentioned by the examiner in the earlier argument with acceptable justification.. The applicant did not deny that definition in principle. However, The applicant produced a different reason as "conductive but not convective" should be the basis of the definition of the DX system. The examiner finds it quite unjustified reason towards a DX system as compare to the available known definition of the DX (direct expansion) system. The Examiner likes to cite more definition for DX (direct expansion system. "The term direct expansion derives from the evaporation and expansion of the liquid refrigerant to vapor in the buried heat exchanger." See column 1, lines 42-44 to US Patent 5,560,220 to Cochran. There is nothing mentioned about the conductive or convective to be a feature to become a DX system.

Another example for a convective heat exchanger as a subsurface DX (direct expansion) system cites that convective heat effect that greatly increase the usefulness

of the aquifer as both heat source and heat sink for exchanging heat. See Para 1 of US Patent 4,448,237 to Riley. This indicates DX (direct expansion) system belongs to both conductive and convective heat transmission system. Therefore, Applicant's new definition regarding DX (direct expansion) system by connecting with unsupported relation with conductive heat exchanger is not based on the facts. Therefore, R-410 as disclosed by Aoyagi is from a direct expansion system and there should be no problem to combine with Wiggs as earlier. Therefore, the Applicant argued that R-410 Refrigerant in a Geothermal DX System is Not Taught or suggested in the cited Art is not true.

In reply to the Applicant's argument that Aoyagi Teaches Away from and is Inoperable with a Geothermal DX system the Examiner has already covered that reply in the above reply and Aoyagi does not teaches away from and is not inoperable with Geothermal DX system as there is no difference in heat transfer feature in a geothermal/sub-surface heat exchange system and a regular heat exchanging system as cited above. Therefore, there is no problem for an ordinary skill of the art to utilize the R-410 refrigerant in view of the knowledge gained from Aoyagi. Therefore, the Applicant's argument that Aoyagi Teaches Away from and is Inoperable with a Geothermal DX system is not true.

In reply to the Applicant's argument that Suzuki does not teach a Polyolester lubricant for DX system the Examiner find no reason to accept the teaching of using Polyolester lubricant in high pressure refrigerant system. Besides the teaching of Suzuki it is within the common knowledge an ordinary skill of art that an existing regular

refrigerant system using R-22 or similar refrigerant can be converted to high pressure or supercritical pressure refrigerant like R-410 or carbon dioxide subject to replace lubricating oil by a suitable lubricating oil. Apart from the common knowledge of an ordinary skill in the art Suzuki clearly indicates that Polyolester oil is a suitable lubricating oil which can be used in a refrigerant system using refrigerant of high pressure or supercritical pressure refrigerant system.. Again, the use of a particular lubricant oil in a refrigerant system does not depend on the type of heat transfer system like direct expansion system (conductive) or direct expansion system (convective) it only depends on the type of refrigerant in the system. Moreover, the Examiner already cited example that there is no difference between a Geothermal or subsurface refrigerant system and regular refrigerant system. It is also within the common knowledge of an ordinary skill that the heat transmission may be either conduction, convection or radiation and accordingly the designing, operating and maintaining features of the heat transfer system are also known to an ordinary skill or the art. Therefore, the Applicant's argument that Suzuki Does Not Teach a Polyolester Lubricant for a DX system is not based on facts.

In reply to the Applicant's argument that Brasz Does not Teach R-410A refrigerant and is operable in a DX system the Examiner states that Brasz does not need to directly teach the use of R-410 refrigerant but teaches of using a refrigerant having a pressure range of between 50 and 180 psi which is within the range of the applicant's claimed pressure range between 80 and 405 psi.. A turbine does not need to use refrigerant unless it is using a compressor for compressing a refrigerant. It is not



appropriate to refer to turbine only and find it an excuse without seeing the application of refrigerant system and the required teachings associated with the refrigerant system. Apart from the teachings of Brasz an ordinary skill of art easily know by he/her common knowledge the ultimate pressure range of the known refrigerant with the help of a known pressure temperature chart. Therefore, the Applicant's argument that Brasz Does not Teach R-410A refrigerant and is operable in a DX system and operational pressure range is not between 80 and 405 psi are not true.

In reply to the Applicant's argument that Applicant's System Operates on R-410A Refrigerant Not Carbon Dioxide and the Prior Art Lack Motivation for R-410A Use in DX Systems the Examiner states that an ordinary skill of art knows that carbon dioxide is not a R-710A refrigerant. However, an ordinary skill of art knows that pressure range of R-41A and carbon dioxide refrigerant is similar and thus also knows the use of lubricating oil in a refrigerant system using either R-410A or carbon dioxide would be also similar. Regarding DX (direct expansion system) the Examiner already proved above that ther is no different of DX (direct expansion) system using in a conductive or convective heat transmission system. Therefore, the above argument of the Applicant is not true.

In reply to the Applicant's Additional Comments that Factually, the results of utilizing an R-410A refrigerant with increased operational pressure between 80 psi in a DX system application were not known until Applicant field tested same the examiner submits that as explained above the Applicant's comments are not based on the facts as Aoyagi has shown above the use of R-410A refrigerant of high pressure range in a

direct expansion system. In addition Brasz has also shown the claimed pressure range between 50 and 180 psi. Therefore, the Applicant's above comment is not true.

In reply to the comments that result enabled Applicant to eliminate the need for a power consuming refrigerant pump to pull refrigerant out of the ground in the cooling mode when operating at a depths beyond 100 feet is not a claimed subject matter. The Applicant claim ranges from 100 feet and above which is already a known subject matter and the Applicant also mentioned in page 18 that DX system reverse cycle designs to operation depth of 100 feet. Therefore, the above comments of the Applicant are not true.

Therefore, the rejection will stand.


**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad M. Ali whose telephone number is 571-272-4806. The examiner can normally be reached on maxiflex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4808. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
MOHAMMAD M. ALI  
PRIMARY EXAMINER